REMARKS

ON THE

UNIVERSAL APPLICABILITY OF THE OPEN-AIR
TREATMENT OF PULMONARY TUBERCULOSIS.

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IN view of awakening interest in relation to tuberculosis, it seems opportune to record the conclusions I have been led to form as the result of ten years' observation with regard to the prevention and treatment of pulmonary consumption in connection with the Victoria Hospital for Consumption, Edinburgh, which was established especially for the treatment of poor patients on the open-air principle. A description of the origin and scope of the hospital has already been published in the *Edinburgh Hospital Reports*, vol. iii., and more briefly in the well-known works on *Sanatoria for Consumption* of Drs. Knopf, Léon-Petit, and Kuthy.

At the Tenth International Congress at Berlin (1890) I ventured to maintain the view that hospitals for the open-air treatment of pulmonary tuberculosis should be founded in relation to all large centres, and might, in my judgment, be as effectively arranged in Scotland as in any part of the world. This view was based on observation of the extremely varying characters of recognised resorts for consumptive patients, and the highly satisfactory results which had been obtained by the adoption of the fresh-air treatment in the practice of an extensive outdoor department for consumption at Edinburgh. Continued observations during the eight years which have elapsed since that date have confirmed and intensified that belief. These include observations made at a large number of the leading sanatoria and health resorts for tuberculous disease at home, on the Continent, and in North Africa, and results obtained at the Victoria Hospital for Consumption at Edinburgh, which was formally opened for the residence of patients four years ago, and where the *cure à l'air libre* has been the basis of treatment throughout.

REPUTED CLIMATIC FACTORS.

In the earlier discussions on the climatic treatment of pulmonary tuberculosis many factors were admitted and rightly emphasised, which cannot, however, be regarded as essential. The recognised fact that tuberculous disease is combated effectively at the sea level and at all elevations to over 6,000 feet, goes far to show that elevation, as such, has little to do with determining the successful result. Similarly the varying mean of temperature recorded at various stations makes us discard temperature as a factor of direct importance. For like reasons we may exclude mere dryness or moisture of the atmosphere, both of which are of significance in particular cases. Comparative stillness of the atmosphere, or, at least, some provision for protection against boisterous or piercing winds, is certainly a powerful adjuvant, usually eminently grateful to the patient, but cannot be regarded as essential in view of the fact that excellent results are attainable on ship-board, and at many sea coast and island resorts with full measure of wind. The nature of the soil is a factor worthy of much consideration in selecting the residence of tuberculous patients, but in the light of the geographical distribution of phthisis cannot be regarded in the category of essentials. Phthisis occurs in all countries where the disease has obtained a footing, and can, I believe, be treated with approximately equal success, or want of success, in all climates, according as the larger indications for treatment are fulfilled or overlooked. It is a comforting doctrine, and economically reassuring, that the tuberculous patient, of whatever country or race, can be suitably treated not far from his own home.

THE ESSENTIAL FACTOR IN TREATMENT.

The one essential is the free exposure of the patient to open air. He must be bathed in fresh air day and night, and this irrespective of whether the weather be good or bad, as popu-

larly understood. The more sunshine, or at least bright sunlight, he can have, the better for the patient. It is remarkable at what different rates in a climate such as this, two patients, starting apparently with the same degree of disease, proceed towards cure according as their dwelling rooms face southward or northward. Every aspect of climate having been considered, I have been led to the conclusion which I have now for long taught to the members of my chest clinic, that the best climate for the treatment of pulmonary tuberculosis is that which woos the patient most into the open air. The one misfortune of our climate is the tendency which its comparative rigour during a large part of the year induces in patients to stay indoors, frequently in over-heated rooms, when they ought to be outside. This protective policy wants to be reversed. I believe, on the other hand, that one of the chief benefits conferred by an ocean voyage is the impossibility of obtaining a screen from through currents, unless the patient is content to remain cooped in his berth. (To this, of course, has to be added the presence of the greater amount of ozone which in every atmosphere is of first curative moment). The experience of the past dozen years has convinced me that if the patient can only be persuaded to be out of doors, lying, sitting, or walking, as the case may be, a large part of each day, and, when indoors, to allow the freest access of fresh air day and night, results may be obtained in almost any district which will compare satisfactorily with those obtainable at most favoured resorts. In order to do this much depends on the confidence in the method inspired in the patient, and this, in turn, on the physician's complete belief in the method proposed. It has frequently been my experience to meet patients, and sometimes colleagues, who unhesitatingly profess a belief in the value of fresh air in the treatment of the disease, but whose practice is hopelessly at variance with what should be implied in such belief.

ADDITIONAL EVIDENCE IN FAVOUR OF THE VIEW.

It seems needless at this date to dwell on the support which the open-air practice receives from other sides. The question of occupation in relation to tuberculosis is, of course, pregnant with suggestion. It is not the outdoor worker who applies chiefly for help at a consumptive hospital. Such are conspicuous by their absence. Thus, out of a record of 6,996 individual cases from all parts in connection with the Victoria Hospital, there occur 32 farm and garden workers, 21 railway men, 15 policemen and watchmen, 13 postmen, lamplighters, etc.; while there occur of indoor workers, on the other hand, 107 bookbinders, 209 clerks, 243 domestic servants, 1,256 housewives, 320 masons (mostly hewers), 117 millworkers, 196 printers, 107 rubber workers, 227 salesmen and saleswomen, 172 dress-makers, and 172 tailors. In keeping with this, the history of the army affords important evidence. Ill-ventilated though seemingly comfortable barracks have wrought intense havoc, while prolonged exposure has been unaccompanied by such results. Similarly, it is not the animal exposed to all weathers and breeding in the open which falls victim to tuberculous disease, but comfortably housed milch cows—"cabined, cribb'd, confined"—whose ranks are decimated. It seems to me probable that the comparative immunity of the goat and certain other animals is in large part to be explained on those lines.

THE VICTORIA HOSPITAL FOR CONSUMPTION, CRAIGLEITH,
EDINBURGH.

The Victoria Hospital was the first, and is apparently still the only, hospital in the United Kingdom for the gratuitous treatment of consumptives strictly on the open-air principle. The outdoor department, which is situated in the heart of Edinburgh, affords a central office where patients are received and treated from day to day, and where suitable patients are selected for hospital residence. The educative value of the outdoor department has been immense. There has been recorded a relative increase in the number of early cases which present themselves, and a corresponding diminution in the frequency of hopeless ones. By daily or frequent visits to the institution patients are induced to lay aside their fear of going about, and are taught by constant reiteration the principles of the open-air system. Although the *clientèle* of this department is both very numerous and poor, it used to seem marvel-

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lous in the earlier days that untoward incidents were so infrequent of occurrence in relation to these visits to the institution in all weathers. The experience of the outdoor department has throughout afforded corroborative evidence as to the value of open-air treatment. At the same time, the patients are instructed in respect of preventive measures. For many years the following rules have been distributed at the out-patient department:

RULES FOR CONSUMPTIVE PATIENTS AND THOSE LOOKING AFTER THEM.

Consumption is a communicable disease. It may pass from person to person. It may pass from one lung to the other, or from one organ to another.

The chief source of infection is the expectoration of the consumptive. The great danger lies in the drying of the expectoration, and the blowing about of the dried infectious material.

The spread of consumption can be largely prevented. *If the succeeding directions be obeyed, there need be no serious danger in ordinary intercourse with patients. The breath of the consumptive is not directly infectious.*

The patient should expectorate into a jar or cup containing a tablespoonful of carbolic acid (1 to 20) or other disinfectant.

The vessel should be changed once in twelve hours, or oftener. It should be cleansed by being filled up with *boiling* water. The combined contents should be poured down the w.c. The vessel should then be washed with *boiling* water.

When the patient is out of doors, he should carry a pocket spitting flask (such as Dettweiler's, or the Victoria Hospital simpler model). The flask should be used and cleansed like the jar. The patient should never spit on the streets.

The patient should not use handkerchiefs for expectoration. If this ever has to be done, the handkerchief should be of an inexpensive material, that it may be burned after use. Squares of rag or paper, which may be used for convenience, should be similarly treated.

The expectoration should on no account be swallowed, for thereby the disease may pass to other organs.

Consumptive patients should avoid kissing.

Consumptive mothers should not suckle.

If expectoration has been accidentally deposited on the floor or other object, it should be wiped up and burned, and the surface of the object cleansed with strong antiseptic.

Rooms which have been long occupied by a consumptive patient should, before occupation by someone else, be carefully disinfected, as after other infectious disease.

FRESH AIR is the food of the lungs. Therefore, see that the lungs be not starved.

A.—By Day.—The patient should occupy as airy a room as possible. It must be scrupulously dry, and preferably removed from the ground. The window should be freely open. When able, the patient should be out of doors once or several times during the day. He must avoid over effort, and damp, or chill, which would counteract the benefit.

B.—By Night.—He should sleep alone. The bedroom should be large and airy. The window should be kept open, less or more according to the season.

THE HOSPITAL PROPER.

The hospital proper is situated about a mile to the north-west of Edinburgh. It is placed advantageously on a gentle slope facing due south, and basks in sunshine to a remarkable extent. The present hospital was not built originally for the purpose, but is an old mansion house which has been adapted sufficiently well. The ground, which extends to $7\frac{1}{2}$ acres, includes a beautiful park and gently inclined lawns and winding paths. The grounds are sheltered, without being overshadowed, on various sides by a splendid belt of trees. The position of the grounds and trees render it possible to gain protection somewhere from every possible wind, while a couple of lawns at different levels catch all available sunshine. The present accommodation of the hospital is limited to 15 patients, 7 male and 8 female, but a considerable extension is shortly expected. The climate is the climate of Edinburgh, temperate, but changeable, with a fair amount of mist and wind. There is, however, at all seasons a sufficient proportion of sunshine. The rooms of the patients are bright, with cubic capacity of approximately 1,000 cubic feet per patient (some have almost twice this amount). Heating is arranged for by open fireplaces, which serve also to assist much in the ventilation. Some of the rooms contain three patients, others two, and others, again, only one. Each room has at least one large window, which is constantly open, day and night, and the larger rooms have three windows, which afford free ventilation by a constant current of fresh air. The temperature is regulated according to thermometric reading. A thermometer is placed in each room and every passage. It is the duty of the nurse or someone deputed by her to watch the thermometers from hour to hour throughout the house. A uniform temperature of 60° F. is demanded. This has been found practically easy of attainment by increasing or diminishing the size of the fires. The windows have never been shut, day or night, since the hospital was opened. The air of the rooms is thus remarkably fresh, so that visitors constantly remark on the absence of stuffiness and used-

upness such as even well-regulated dwelling-houses exhibit in some degree. The furniture of the room is of the simplest. The floors are plain and polished, and the walls are coloured with distemper, which is renewed from time to time. The bedsteads have an open spring mattress, covered by a very light hair mattress, and the bed clothing is made as little as it can be, compatibly with comfort. There is a simple bedside table, made of glass and metal, which comes readily to pieces for cleansing purposes, an adaptation of the small recently introduced instrument tables. The lower shelf of this is screened by means of a thin cotton strip, which is frequently renewed. The expectoration is carefully treated along the lines which have just been indicated. No patient is allowed to expectorate within doors or outdoors save into the receptacle provided for the purpose.

THE METHODS OF TREATMENT IN PRACTICE.

1. *Free Access of Fresh Air and Sunlight into the Rooms.*—As already indicated, the rooms are bright, with one to three large windows, facing especially south. One or two of these windows in each room have never been closed since the hospital was opened. Most of the windows are provided with a closely fitting board, 8 inches deep, which is placed within the lower part of the framework, and on which the lower edge of the lower sash rests. This allows, even in the stormiest weather, a free but gentle current of air to pass upwards between the sashes into the room. Under ordinary conditions of weather, however, the windows and doors are freely opened in addition. The windows are not allowed to be closed merely to raise the temperature within the room. This must be effected by an increase of fuel throughout the house. In practice it has been found easy in this way to obtain a uniform temperature of 60° F. The patients are thus taught, and very soon learn, to fear a draught less than a stuffy atmosphere.

2. *Out-of-door Life.*—Under ordinary conditions every patient is out of doors for a considerable portion of the day, the length of time being prescribed in individual cases just as are the diet and medicines. The more delicate patients, especially those with marked pyrexia and circulatory disturbance, are conveyed outside to reclining chairs, or the bed is carried out without disturbing the patient. Care is taken that such patients are kept sufficiently warm by suitable clothing. I have treated thus patients with considerable pleural effusion with much advantage. For other cases, walking exercise on the gently sloping paths is enjoined, with rest from time to time. During the finer weather meals are commonly taken outside.

3. *Graduated Exercise.*—Some of the patients rest entirely at first. The great determinant under this head is the state of the circulation. For others quiet walking exercise during regulated intervals is sufficient. This is often combined with the use of a simple retaining apparatus, whereby the shoulders are thrown backward, the elbows approximated behind, and the play of the chest, especially in its upper portion, rendered free. Other patients are allowed light dumb-bell or Indian club exercises, with the same object in view. To still stronger patients mild golfing or quoit-throwing is permitted, and to those further on, gentle cycling exercise. In addition, simple garden games of various kinds are permitted in sheltered corners, according to the direction of the wind. In the regulation of these measures, the pulse is regarded as a better indicator than the stethoscope.

4. *Clothing.*—Sufficiently warm but light clothing is prescribed. To meet this indication there is nothing better than the well-known Shetland materials. The patients are taught that, as cold has not produced their disease, so the piling on of clothes will not cure them, and is, contrariwise, distinctly harmful in most cases. Thus chest-protectors, which simply harbour dirt and foul odours, are forbidden, and the extraordinary and varied wardrobe in which the patient generally arrives is speedily simplified. The patient is taught that, just as the fresh air must be freely admitted to his lungs, so the surface of his body may be exposed to its benign influence without harm.

5. *Bathing.*—Even the most delicate patient is sponged gently but widely, once or preferably twice, daily. In all cases, where there is not a distinct contraindication, the patient after some ten days' observation is prescribed a regular bath. This is simply a momentary dip, the temperature of the

water being regulated according to the season, but always to the cool side. This has proved in my experience a great advantage, and has never been followed by the slightest accident. The bath is succeeded by rapid dry-rubbing—in more delicate cases by a nurse or attendant, and in stronger cases by the patient himself. In some instances more formal massage is practised with advantage by the nurse, and frequently oily applications—chiefly stimulating, with perhaps cod-liver oil as the basis—are applied. It is marvellous how soon unhealthily acting skins come to function properly.

6. *Dietary.*—In most cases five meals are allowed daily. Of these, three are the more formal breakfast, dinner and tea, while, between breakfast and dinner, a cup of soup or warm milk or the like, and towards bed-time something similar is given. Milk is allowed freely throughout, and forms a large proportion of the dietary in pyrexia cases. In many of these, raw meat juice in various forms is regularly supplied. Stimulants are not exhibited universally, but in pyrexia conditions, and in cases where there is much prejudice of the circulation are usually prescribed. Before and after the larger meals, the patients are enjoined to rest for a little, and the more delicate recline on a couch or in bed.

7. *Medicinal Treatment.*—It is unnecessary to discuss this at present. It is sufficient to say that fattening agents are freely used. Cod-liver oil, which somehow or other seems to have fallen more into the background than it deserves, in recent times, is freely used. It has been found that, if the larger hygienic measures which have just been detailed are pursued, the inconveniences frequently reported by patients do not appear. In addition to this the prolonged use of arsenic has often proved most helpful. Such measures, combined with one or other of the more specific lines of treatment, are usually important adjuvants, but I am satisfied that in the absence of the other methods they are of comparatively little use in most cases. In some instances throughout, and in many for a period at least, they may be advantageously dropped.

RESULTS OF THE OPEN-AIR TREATMENT.

(a) In the first place, it is right to emphasise that during prolonged experience of this treatment I have not witnessed one untoward incident resulting therefrom. During the years which have elapsed since the hospital was opened there has not been a single day on which some of the patients have not been outside, and on most days almost all have been able to be out for a time. Rain and snow have not been allowed to form a contraindication. In such weather the patients are suitably shod and mantled, the shoes and mackintoshes being put on and thrown off in an outer hall.

(b) A remarkable change of type of disease occurs speedily. Within three or four days, the patient's colour begins to manifest a healthier aspect. His appetite rapidly picks up, so that patients whose chief complaint was anorexia may within ten days or so eat voraciously. Night sweats disappear almost at once. Again and again I have admitted patients either from their own homes or from other hospitals who required to have their clothing changed several times throughout the night, and within a week's time those patients have ceased to manifest this distressing symptom, their night rest being simultaneously benefited. So uncommon is this symptom that, while I was anxious to accede to the request of one of my colleagues that he might have an opportunity of conducting some observations thereon, he had to go elsewhere in order to obtain sufficient material. Similarly, the temperature in most cases, which may have been both irregular and high previous to admission, tends gradually to assume the normal, or rather the slightly subnormal, which is the rule in many cases of latent tuberculosis. In like manner, the cough quickly lessens, and finally disappears. It has been frequently remarked to me by visitors going round the wards how seldom the patients coughed. The body weight, too, and general condition show corresponding improvement. An increase of 14 to 16 pounds has not been an uncommon incident during the comparatively short stay which a hospital with limited accommodation for poor patients permits.

(c) The educative value of such residence cannot be overestimated. The patients learn unconsciously how to treat themselves. They realise how practically true it is that open air, day and night, and sunlight are their best friends, and that attention to hygienic measures can be their salvation.

They thus become on their discharge from the hospital apostles of the new faith, and one frequently hears of the results of their teaching in their own homes.

(d) In so chronic and treacherous a disease it is not wise to speak confidently of cures effected. The proportion of patients, however, who have left the hospital and maintained for years continuously good health and been able to resume regular work, perhaps with a change of employment, is a large one. The list includes cases where both lungs and larynx were involved on admission. On the other hand, disappointments are frequent. Some of the most promising cases have returned on our hands or have gradually fallen back elsewhere. The proportion of these cases is larger than it should be from causes over which we have meantime no control. In the first place, our patients are chiefly in poor circumstances, and are compelled too rapidly to resume the conditions of life which induced the disease. And secondly, the resources of the institution are so limited and the demands so enormous that the patient's stay in hospital has often to be curtailed when it ought to be prolonged.

(e) The course of treatment is a pleasant one. There are none of the drawbacks which have sometimes been portrayed in relation to hospitals for consumptive patients. Far from being a gloomy place our hospital is one of the brightest of households. The only dull day in most cases is the day when the patient's discharge is signed.

LENGTH OF RESIDENCE.

Under present regulations, the patient's stay is practically limited to some two months. This in some cases is sufficient, either to start the cure or effect such amelioration that, if the patient can continue generally the same line of treatment, he does well. But in the larger group of patients it is not sufficient. The results of my experience suggest that a residence of from four to six months is desirable. Because this is meantime impossible, however, we have framed a regulation which permits likely patients to avail themselves of the benefits of the hospital *régime* by spending the day in the hospital grounds and dining with those in residence.

ANTI-TUBERCULOSIS ORGANISATION.

During the past eleven years it has been my endeavour to create an interest in an organised effort against tuberculosis within this district, and through the co-operation of a number of citizens, both medical and lay, much has been effected. I venture to suggest that the successive steps which have been followed in our experience will prove factors of value in all wisely-directed organisations against a disease which is at once the bane of humanity and the opprobrium of medicine. These include (1) the selection of a suitable committee of citizens, both medical and lay, who are sufficiently alive to the necessity to take determined and concerted action; (2) the institution of a central outdoor department in the heart of our larger towns with the double object both of treatment and education; and (3) the erection of a hospital whose basis of treatment shall be the hygienic measures we have discussed. This hospital, while sufficiently removed from the smoke and other impurities of town life, should not be too far removed. There are many practical difficulties when the hospital is out of the way. Further, the patient must not be led to suppose that cure can only be effected and health maintained under conditions totally divorced from those which are obtainable near his own door. The experience at the Victoria Hospital goes clearly to prove that most satisfactory results can be obtained in this way. Beyond this, however, I would fain (4) see established what, for want of a better name, we may term a tuberculous colony where poor patients might be enabled, for long periods and under hygienic conditions, to maintain themselves honourably by contributing to the common good of the residents. This is not a Utopian idea, but has been already tested in my experience in the case of several of our patients with excellent results. Thus we have had, for a couple of years, as auxiliary gardener to the hospital, a man who was admitted first as a patient with grave pulmonary and laryngeal disease, and who now lives in the vicinity of the hospital, spends his days with us, working in the way referred to, and is doing well. Such tuberculous colony will be wisely placed in some situation where the climatic and other conditions are especially favourable.

Lastly, it will be the function of such an organisation to insist that special asylums for admittedly dying cases of tuberculosis among the poorer classes should be erected by the local authorities, in the interests both of the dying and the living, and that wisely-conceived preventive measures be adopted by every community.

PERFORATION OF A TYPHOID ULCER : OPERATION : RECOVERY.

BY
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PERFORATION of the intestine in typhoid fever is unfortunately not uncommon, and although there is little doubt that recovery does occasionally, though very rarely, follow, the result in the vast majority of cases is fatal unless surgical aid be sought. No very great measure of success can be expected from operation undertaken under such desperate circumstances. Nevertheless Finney,¹ of Baltimore, has collected 47 undoubted cases of operation with 13 recoveries, a percentage of 27.65.

The diagnosis of perforation in the earliest stage is by no means always easy. This is shown by several published cases which have been operated upon and no perforation found, and by the fact that out of the 47 cases collected by Finney, in 8 a wrong diagnosis had been made. Typhoid perforation was found, but appendicitis or some form of intestinal obstruction had been diagnosed.

By far the most important difficulty in recommending operation is the fact that usually when perforation occurs the patient is prostrated by an acute and exhausting disease, the course of which is not yet terminated. The present case was an unusually favourable one, because the attack had never been very severe, and the patient was not exhausted. The perforation occurred during convalescence after nearly a week's normal temperature. My absence in the country caused an unfortunate delay, but the case shows that even after twenty-two hours or more operation may be undertaken with success. The severe nephritis during convalescence from the operation was very unfortunate, and has much delayed complete recovery. It was probably due to a septic infarction of the kidney, which suppurated and discharged into the pelvis of that organ.

HISTORY.

G. S., aged 27, was admitted on February 15th, 1898. He had not been well for three weeks, and had been in bed six days complaining of pain in the head and limbs, diarrhoea, sickness, sore throat, cough, deafness, and nocturnal delirium. On admission the temperature was 102° F.; there were numerous spots, and the spleen could be felt. There was no albumen in the urine, and his case ran a moderate and uneventful course. There was slight diarrhoea for three days; the highest temperature was 103° F., and the temperature reached normal on March 2nd, being the sixteenth after admission, the twenty-first in bed, and probably the twenty-fifth of the disease. He was kept exclusively upon milk and beef tea until March 2nd, when a beaten-up egg was allowed. On March 4th the temperature rose to 101° F., and was thirty-six hours in subsiding. The pulse had fallen to between 80 and 88 per minute, and he appeared quite convalescent, but no solid food was given for fear of a relapse. On the evening of March 10th, the twenty-ninth day in bed, and probably the thirty-third of the disease, he complained of a sudden pain in the abdomen, but the pulse did not rise above 90, and the temperature remained subnormal. The bowels were moved, and a trace of blood appeared in the motion. There was no sign of collapse. Opium was given by the mouth, and next morning, as the pain continued, a hypodermic injection of morphine. I was out of town, and was unable to see him until twenty-one hours after the sudden onset of the abdominal pain. By that time his pulse had risen to 120, his temperature to 102° F., and it was evident that he had perforation and commencing peritonitis. My surgical colleague, Mr. Anderson, was fortunately within reach, and gives the following account of the operation, which was commenced 22½ hours after the occurrence of the perforation.

OPERATION.

An incision 4 inches long was made in the mid-line below the umbilicus. On opening the peritoneum some gas and feculent matter escaped. The whole of the small intestine was deeply congested and covered with patches of lymph. Examination of the coils within view did not reveal the leakage, so the cæcum was found, the ileum traced from its termination, and the perforation found within 3 feet of it, the opening being about the size of a bean. Its edges were thinned, but not excessively. The loop of bowel was pulled out of the abdomen, and the hole closed by Lembert's sutures of fine silk. The edges of the opening were not pared, and the intestinal walls on either side of it, although thinned by ulceration, were in sufficiently good condition to hold the sutures well. The small intestine was then pulled out loop by loop, wiped with sponges wet with 1 in 2,000 biniodide solution, and replaced, until the whole had in this way been cleansed. The pelvis and loins were treated in the same way. Douching was not employed. The presence of septic peritonitis was well marked over the whole area occupied by the small intestine, and also in the pelvis. The abdominal wound was closed completely; no drain was used.

AFTER-HISTORY.

The urine had been tested twice a week up to the date of the perforation, and always found quite free from albumen. Two days after the operation there was a cloud of albumen, which soon disappeared. Again, on March 27th and April 3rd the urine is recorded as quite free from albumen. On April 4th the temperature, which had been normal for a fortnight, began to rise to 100° and 101°; and on April 6th the urine was smoky and contained a large amount of blood and albumen. The albumen rapidly diminished, though a few blood and epithelial casts were found. The temperature returned to normal, and he appeared to be going on well until April 23rd, when the temperature rapidly rose to 105.2° and the quantity of blood and albumen again increased. By May 3rd the temperature was again normal, casts were very rarely found, but about one ounce of pus was discharged in the urine daily. At this date (June 8th) the albumen is very slight in amount, and is fully accounted for by about 1 drachm of pus which is still passed. The quantity of urine is 60 to 80 ounces daily, and the specific gravity 1015. The patient is on meat diet, sitting up, and gaining flesh. Had it not been for the unfortunate renal complication he would have been out long ago. The wound has been soundly healed for several weeks.

REFERENCE.

¹ *Annals of Surgery*, 1897, p. 239.

ON FURTHER EXPERIENCES OF DANGERS CONNECTED WITH RESPIRATION AND THEIR AVOIDANCE;

WITH SPECIAL REFERENCE TO ANÆSTHESIA, HÆMOPTYSIS,
DROWNING, APOPLEXY, AND ALL PARALYSED
AND UNCONSCIOUS CONDITIONS.

By R. L. BOWLES, M.D., F.R.C.P.

THE unconscious state which most commonly presents itself to us as coma implies loss of feeling as well as of consciousness, and a general paresis or loss of muscular sense and power. All mental and bodily powers are more or less in abeyance, and only those final organic forces, circulation and respiration, remain in action, whilst even they are then depending upon but a central spark of life to sustain their functions.

In the treatment of it, when life is threatened, it matters little which gives way first, respiration or circulation; our duty is, clearly, to keep them both in action and to prevent anything coming in the way of their easy, regular, and orderly function. It is to this department of the subject that I now propose to address myself.

For clearness I will remind you of some experimental observations on the dead body, undertaken for the late Dr. Marshall Hall in the years 1855 and 1856 by the now distinguished physician, Dr. Edward Long Fox, of Clifton, the late Mr. Charles Hunter, and myself, with the object of settling some important questions in the management of the appar-